

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - MAIN PROP. FMEA NO 05-6J -2017 -2 REV:04/25/88

ASSEMBLY :MID PCA-1, 3	CRIT. FUNC: 1R
P/N RI :MC477-0263-0002	CRIT. HDW: 2
P/N VENDOR:	VEHICLE 102 103 104
QUANTITY :2	EFFECTIVITY: X X X
:TWO	PHASE(S): PL LO X OO DO LS
:	

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
DES <i>J BROWN</i>	DES <i>R. Berman</i>	EPDC SSM <i>[Signature]</i>
REL F DEFENSOR <i>[Signature]</i>	REL <i>Melvin Cl for 5-6-88</i>	MPS SSM <i>[Signature]</i>
QE <i>D MASAI</i>	QE <i>J. J. Conner 5-6-88</i>	EPDC REL <i>[Signature]</i>
		MPS REL <i>[Signature]</i>

ITEM:

CONTROLLER, HYBRID DRIVER (HDC), TYPE III, LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID (LV 24).

FUNCTION:

CONDUCTS POWER TO CLOSE SOLENOID IN EACH REDUNDANT CIRCUIT FOR LO2 RELIEF SHUTOFF VALVE. HDC IS IN SERIES WITH A DIODE AND A RPC IN EACH CIRCUIT. 40V76A25AR42, 40V76A27AR30.

FAILURE MODE:

INADVERTENT OUTPUT, FAILS "ON", FAILS TO TURN "OFF".

CAUSE(S):

PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE (E) FUNCTIONAL CRITICALITY

(A) DEGRADATION OF REDUNDANCY AGAINST PREMATURE ACTUATION OF CLOSE SOLENOID.

(B) NO EFFECT - FIRST FAILURE. SERIES RPC PREVENTS INADVERTENT POWER TO LO2 RELIEF SHUTOFF VALVE CLOSE SOLENOID.

(C,D) NO EFFECT - FIRST FAILURE.

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- (E) 1R/2, 1 SUCCESS PATH AFTER FIRST FAILURE. TIME FRAME - ASCENT.
1) HDC FAILS "ON".
2) SERIES RPC FAILS "ON" CAUSING LOSS OF CAPABILITY TO OPEN LO2 RELIEF SHUTOFF VALVE (PV7).

RESULTS IN LACK OF RELIEF CAPABILITY PRIOR TO DUMP. POSSIBLE RUPTURE OF THE LO2 MANIFOLD CAUSING LO2 LEAKAGE INTO AFT COMPARTMENT, OVERPRESSURIZATION, AND FIRE/EXPLOSION HAZARD. POSSIBLE LOSS OF ADJACENT CRITICAL COMPONENTS DUE TO CRYOGENIC EXPOSURE.

A VENT PATH EXISTS (APPROXIMATELY 4 SCFM PER BLEED CHECK VALVE) THROUGH THE POGO SYSTEM TO THE SSME HPOT SEAL AND RELEASED OVERBOARD. THIS VENT PATH IS NOT CONSIDERED SUFFICIENT TO RELIEVE THE LO2 MANIFOLD IF THE MANIFOLD RELIEF SYSTEM FAILS. POSSIBLE LOSS OF CREW/VEHICLE.

FAILS B SCREEN DUE TO SERIES CIRCUIT CONFIGURATION.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A-D) DISPOSITION AND RATIONALE:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER.

(B) GROUND TURNAROUND TEST

COMPLETE ELECTRICAL VERIFICATION V41ABC.070 I EVERY FLIGHT.

(E) OPERATIONAL USE

LO2 MANIFOLD PRESSURE IS ON CAUTION AND WARNING.

POST MECO/PRE DLMP: START MPS PROPELLANT DUMP AS SOON AS POSSIBLE.

POST DUMP: OPEN THE LO2 FILL/DRAIN VALVES.